

# Information

## Using an Unna's Boot in Treating Ligamentous Ankle Injuries

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LIGAMENTOUS INJURIES of the ankle are commonly encountered by primary care physicians and account for 75% of all ankle injuries.<sup>1</sup> These injuries are responsible for considerable patient morbidity. Most patients report inability to bear weight,<sup>2</sup> swelling,<sup>3</sup> traction pain<sup>4</sup> and pressure pain.<sup>2</sup> Possible complications of a sprained ankle include dislocation of peroneal tendons, development of chronic instability, injury to the peroneal nerves and the tarsal tunnel syndrome.<sup>5</sup> It is important to distinguish in the office or emergency department which injuries are severe sprains (complete or third-degree ruptures) that require referral to an orthopedist.

Many different treatment modalities have been proposed for first-degree and second-degree sprains; controversy exists between plaster immobilization and surgical intervention for treatment of third degree sprains.<sup>5,6</sup> For mild and moderate ligamentous injuries, elastic bandage wrap,<sup>7</sup> ice application followed by range-of-motion exercise,<sup>8</sup> taping,<sup>6</sup> hematoma injection with procaine hydrochloride and hyaluronidase,<sup>9</sup> Hexcelite (padded) posterior splint,<sup>10</sup> bulky pressure dressing,<sup>11</sup> Orthoplast splint, air-stirrup splint,<sup>12</sup> joint aspiration and lidocaine hydrochloride (Xylocaine) infiltration<sup>13</sup> have been proposed. Each of these modalities

has one or more disadvantages for a busy emergency department (Table 1).

There are very few studies in the literature in which the eventual outcome using the various treatment modalities for ligamentous ankle injuries is discussed. Recovery time in a group of patients with ankle sprains was significantly less in those in whom Xylocaine infiltration was used (4.4 days) than in those without injection (10.7 days). Both groups were treated by means of elevation, ice compression wraps, crutches and early mobilization.<sup>13</sup> In another study, no difference in outcome occurred in patients treated with either an elastic wrap or a plaster splint.<sup>14</sup>

Elastic wraps can be applied quickly and easily. Their cost is low and vascular compromise from overexuberant wrapping is unusual.<sup>7</sup> The wrap, however, provides poor support and treatment is often not taken seriously by the patient, in many cases leading to reinjury.

Ice application and range-of-motion exercises may be desirable for a team athlete with a minor injury. This modality is usually not applicable to sedentary patients who do not have an athletic trainer available who has extensive knowledge of biomechanics and anatomy. Without careful supervision, the potential for reinjury is high.<sup>8</sup>

Taping with adhesive cloth material can provide excellent support but requires skill to apply. Frequent reapplication is necessary due to the material's rapid softening and resultant loss of support. Generally, taping is used in facilities where athletic trainers or therapists are available.<sup>6</sup>

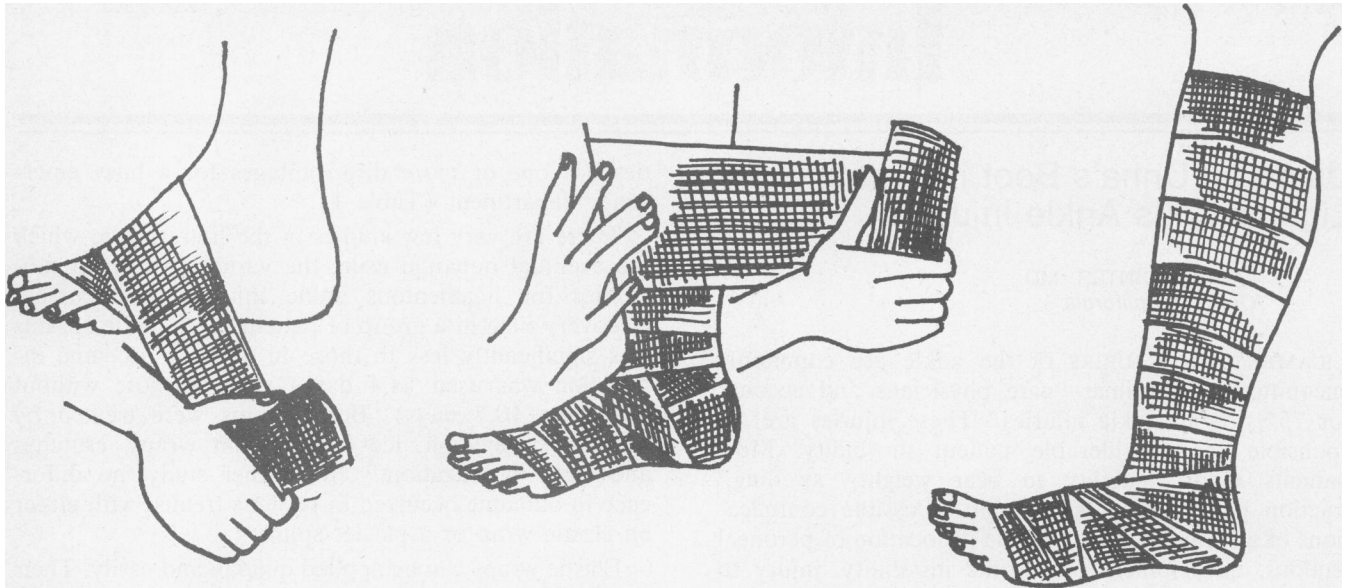
Hematoma aspiration or injection is infrequently used in an emergency department. It requires considerable skill and careful follow-up evaluation. This technique, of course, does not stabilize an injured ankle.<sup>9</sup>

The Hexcelite and air-stirrup splints are very good

TABLE 1.—Methods of Treating Ligamentous Ankle Injuries

Method	Time of Application (minutes)	Skill Required to Apply	Potential Associated Complications	Support Provided	Patient Compliance Required	Approximate Patient Cost	Mobilization Promoted (ambulation)
Unna's boot	2	++	+	++	+	\$ 5.50	++
Elastic wrap	1	+	+	+	+	\$ 4.50	++
Ice application with range-of-motion exercises	1	++	+	0	+++	nil	++
Taping	3-5	+++	++	++	+++	nil	++
Hematoma injection	5	+++	++	0	+	\$ 41.00	+++
Hexcelite posterior splint	1-2	+	+	++	+	\$ 52.00	++
Bulky pressure dressing	3	++	+	+	+	\$ 6.50	++
Air-stirrup splint	1-2	+	+	++	+	\$ 32.00	++
Short-leg cast—plaster	10	+++	+++	+++	+	\$ 80.00	+
Short-leg cast—fiberglass	10	+++	+++	+++	+	\$100.00	++

+ = minimal, ++ = moderate, +++ = maximal.



**Figure 1.**—Application of the Unna's boot. The boot is applied, similar to cast material, from the metatarsal heads to the tibial tubercle.



**Figure 2.**—The completed application of the Unna's boot. A 10-cm (4-in) elastic rolled bandage is applied over the boot to prevent soiling of garments.

immobilizers of the ankle and are quick and easy to apply. The cost, particularly of the Hexcelite splint, is prohibitive for most hospitals. These splints can be easily removed by patients, often before medically desirable.<sup>12</sup>

A bulky pressure dressing is an easy, safe treatment modality, but for the relatively little support it provides, it is cumbersome for patients. Other than reinjury, there are few potential complications.

A plaster or fiberglass cast is frequently used for severe sprains; it has some limitations for grade I and grade II sprains. Both types of cast ensure excellent support of the ankle. The fiberglass cast enables a patient to walk or even swim but is relatively costly. All casts take time to apply, and a follow-up visit is always required for removal.<sup>11</sup>

The modified Unna's paste boot<sup>11,15</sup> is an ideal outpatient or emergency department treatment for non-severe ligamentous injuries of the ankle. The Unna's boot is a medicated bandage for leg or arm. One brand, Dome-Paste Bandage (Miles Pharmaceuticals, West Haven, Conn), consists of cotton-gauze mesh impregnated with zinc oxide, calamine and gelatin. The bandage is slightly sticky to the touch and measures 10 cm (4 in) by 9.14 m (360 in). This bandage costs a pharmacy or central supply less than \$3.50 and is available without prescription. After 24 to 48 hours the bandage dries to a leathery, not completely hard, consistency. The boot is quickly and easily applied and provides good support with little danger of vascular compromise. It allows patients to bear weight when appropriate and to retain proprioception, an important concern to athletes.<sup>15</sup> The Unna's boot is greatly underused by the medical community and is not recognized as a treatment method by even emergency department personnel. A review of standard orthopedic and emer-

gency care texts<sup>6,9,16-20</sup> finds no mention of the Unna's boot in the treatment of ligamentous ankle injuries.

### Technique of Applying

The boot is applied directly from the package in a fashion similar to rolled cast material. Gloves can be worn to protect the hands. A tubular stockinette is applied from the knee joint to the phalanges. The boot is applied directly over the stockinette from the metatarsal heads superiorly to the tibial tubercle (Figure 1). After application, a 10-cm (4-in) rolled elastic bandage may be applied to prevent soiling of garments (Figure 2). Patient instructions can be tailored to individual needs, but generally the bandage is removed two days after edema has disappeared and painless weight-bearing is possible, about seven days in most patients with first- and second-degree sprains. At this point, a rehabilitation program is prescribed, in association with taping or another boot application.<sup>15</sup> An exercise program,<sup>21</sup> tilt board and drills<sup>15</sup> can be prescribed for active or athletic patients.

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